

What is claimed is:

1. A method for fabricating a reactive solder or braze, comprising:
forming a metallic matrix with an interior region and surface regions by
actively providing a higher concentration of reactive atoms to the interior region than
to the surface regions.
- 5 2. The method of claim 1, wherein the providing comprises:
implanting ions of the reactive atoms through a front surface of the metallic
matrix to form a buried layer of reactive atoms in the interior region.
3. The method of claim 1, wherein the reactive atoms include one of IIIB
elements, IVB elements, and rare earth elements.
- 10 4. The method of claim 1, wherein the providing further comprises:
implanting ions of the reactive atoms through a back surface of the metallic
matrix to form a second buried layer of reactive atoms in the interior region.
5. The method of claim 4, wherein the implanting through the front and back
surfaces produces different species of reactive atoms in the two layers.
- 15 6. The method of claim 1, wherein the providing further comprises:
making the interior region from a solid metallic composition that has reactive
atoms dispersed therein; and
 wherein the forming further comprises bonding the surface region to an
exterior of the solid metallic composition.
- 20 7. The method of claim 6, wherein the bonding comprises:
placing a layer of metal adjacent to a surface of the solid metallic composition;
and
 applying a pressure that fuses the layer to the surface of the solid metallic
composition.
- 25 8. The method of claim 6, wherein the bonding comprises coating a portion of
the surface of the solid metallic composition with a layer of metal.
9. The method of claim 8, wherein the coating comprises performing a thin
film deposition of the metal on the surface of the solid metallic composition.

10. The method of claim 8, wherein the coating comprises placing a portion of the surface of the solid metallic composition in a liquid comprising the metal in molten form.

11. The method of claim 8, wherein the coating comprises electroplating the metal on the surface of the solid metallic composition.

12. The method of claim 6, wherein the reactive atoms include one of IIIB elements, IVB elements, and rare earth elements.

13. A solder or braze composition, comprising:
a metallic matrix having first and second surface regions and first and second interior regions, the first and second interior regions being adjacent the respective first and second surface regions, the interior regions having higher concentrations of reactive atoms than the surface regions, the first and second interior regions having different species of reactive atoms dispersed therein.

14. The composition of claim 13, wherein the reactive atoms are absent in the surface regions.

15. The composition of claim 13, wherein the reactive atoms are selected from a group consisting of group IIIB elements, group IVB elements, and rare earth elements.

16. The composition of claim 13, wherein the surface and interior regions of the metallic matrix comprise different metals.

17. A solder or braze composition, comprising:
a first matrix material of one metal; and
a second matrix material of a different metal being bonded to the first matrix material, the first matrix material being located inside the second matrix material and having a higher concentration of reactive atoms than the second matrix material.

18. The composition of claim 17, wherein the reactive atoms are absent from the second matrix material.

19. The composition of claim 18, wherein the reactive atoms are selected from a group consisting of group IIB elements, group IVB elements, and rare earth elements.